

The features and other details of the invention will now be more particularly described and pointed out in the claims. It will be understood that the particular embodiments of the invention are shown by way of illustration and not as limitations of the invention. The principle features of this invention can be employed in various embodiments without departing from the scope of the invention. All references cited herein including those in the background section are expressly incorporated herein by reference in their entirety.

What is claimed is:

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1. An electret filter media comprising a meltblown polymer fiber web having formed on at least one surface thereof a polymer coating.
2. The electret filter media of claim 1, wherein the polymer coating is formed by vapor phase deposition upon the fiber web of an oleophobic and/or hydrophobic monomer selected from the group consisting of an alkylene, an acrylate, and a methacrylate, followed by the curing of the monomer.
3. The electret filter media of claim 2, wherein the monomer is halogenated.
4. The electret filter media of claim 3, wherein the monomer is a fluorine-containing monomer.
5. The electret filter media of claim 3, wherein the monomer is hexafluoropropylene.
6. The electret filter media of claim 1, wherein said filter media has a filter efficiency and degradation value of at least P 95.
7. The electret filter media of claim 1, wherein the polymer coating is a fluoropolymer.
8. The electret filter media of claim 7, wherein the fluoropolymer is selected from the group consisting of polytetrafluoroethylene and fluorinated ethylenepropylene.
9. The electret filter media of claim 1, wherein the fiber web is a meltblown polymer fiber web that is formed from polymers selected from the group consisting of polyolefins, acrylics, vinyl halides, polyvinyl ethers, polyvinyl halides, polyacrylonitrile, polyvinyl ketones, polyvinyl esters, polyamides, polyesters, polycarbonates, polyimides, polyethers, and fluoropolymers.

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10. The electret filter media of claim 9, wherein said fiber web includes polymer fibers having a diameter in the range of between about 1 to 20 μm .
11. The electret filter media of claim 1, wherein the weight of said fiber web is in the range of between about 10 to about 520 g/m^2 .
12. The electret filter media of claim 1, wherein a charge stabilizing additive is incorporated into the fiber web as a meltblown additive.
13. The electret filter media of claim 12, wherein the charge stabilizing additive is a fatty acid amide.
14. The electret filter media of claim 13, wherein the fatty acid amide is selected from the group consisting of stearamide, ethylene bis-stearamide, and ethylene bis-palmitamide.
15. The electret filter media of claim 12, wherein the charge stabilizing additive is present in the meltblown fiber web at a concentration in a range from about 0.01% to 20% by weight
16. The electret filter media of claim 1, wherein polymer coating has a thickness of about 100 to 1500 Angstroms.
17. An electret filter media comprising an oleophobic and/or hydrophobic vapor phase deposition treated electret polymer fiber web having a melt processable charge stabilizing additive within said web, wherein said additive is present at a concentration in a range from about 0.01% to 20% by weight.
18. The electret filter media of claim 17, wherein the fiber web has a polymer coating formed thereon.

19. The electret filter media of claim 18, wherein the polymer coating is formed from the polymerization of a monomer selected from the group consisting of an alkylene, an acrylate, and a methacrylate.

20. The electret filter media of claim 19, wherein the monomer is halogenated.

21. The electret filter media of claim 20, wherein the monomer is a fluorine-containing monomer.

22. The electret filter media of claim 21, wherein the monomer is hexafluoropropylene.

23. The electret filter media of claim 17, wherein said filter media has a filter efficiency and degradation value of at least P 95.

24. The electret filter media of claim 17, wherein said fiber web includes polymer fibers having a diameter in the range of between about 1 to 20 μm .

25. The electret filter media of claim 17, wherein the weight of said fiber web is in the range of between about 10 to about 520 g/m^2 .

26. A respirator having a filter element comprising a meltblown polymer fiber web having formed on at least one surface thereof a polymer coating.

27. The respirator of claim 26, wherein the polymer coating is formed by vapor phase deposition upon the fiber web of an oleophobic and/or hydrophobic monomer selected from the group consisting of an alkylene, an acrylate, and a methacrylate, followed by the curing of the monomer.

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28. The respirator of claim 27, wherein the monomer is halogenated.
29. The respirator of claim 28, wherein the monomer is a fluorine-containing monomer.
- 5 30. The respirator of claim 29, wherein the monomer is hexafluoropropylene.
31. The respirator of claim 26, wherein the polymer coating is a fluoropolymer.
32. The respirator of claim 31, wherein the fluoropolymer is selected from the group consisting of polytetrafluoroethylene and fluorinated ethylenepropylene.
- 10 33. The respirator of claim 26, wherein the polymer fiber web is formed from polymers selected from the group consisting of polyolefins, acrylics, vinyl halides, polyvinyl ethers, polyvinyl halides, polyacrylonitrile, polyvinyl ketones, polyvinyl esters, polyamides, polyesters, polycarbonates, polyimides, polyethers, and fluoropolymers.
- 15 34. The respirator of claim 26, wherein a charge stabilizing additive is incorporated into the fiber web as a meltblown additive.
- 20 35. The respirator of claim 34, wherein the charge stabilizing additive is a fatty acid amide.
- 25 36. The electret filter media of claim 35, wherein the fatty acid amide is selected from the group consisting of stearamide, ethylene bis-stearamide, and ethylene bis-palmitamide.
37. The electret filter media of claim 34, wherein the charge stabilizing additive is present in the meltblown fiber web at a concentration in a range from about 0.01% to 20% by weight

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38. A method for manufacturing an electret filter media comprising the steps of:
providing a fiber web;
vaporizing an oleophobic and/or hydrophobic monomer;
condensing the vaporized monomer onto at least one surface of the fiber web to
form a monomer coating on the fiber web;
exposing the monomer coating to sufficient energy to cause the monomer to
polymerize, forming a polymer coated fiber web; and
treating the polymer coated fiber web to form substantially permanent charge pairs
or dipoles in the meltblown polymer fiber web.
39. The method of claim 38, wherein the monomer is selected from the group
consisting of an alkylene, an acrylate, and a methacrylate.
40. The method of claim 39, wherein the fiber web is a meltblown fiber web.
41. The method of claim 40, wherein the monomer is halogenated.
42. The method of claim 41, wherein the monomer is a fluorine-containing monomer.
43. The method of claim 42, wherein the monomer is hexafluoropropylene.
44. The method of claim 38, further comprising the step of annealing the fiber web at
an elevated temperature prior to the step of condensing the vaporized monomer.
45. The method of claim 44, wherein the temperature is between about 65°C and
230°C.
46. The method of claim 44, wherein the fiber web is annealed for about 15 second to 5
minutes.

47. The method of claim 38, further comprising the step of preparing the surface of the fiber web prior to the step of vaporizing an oleophobic and/or hydrophobic monomer.

48. The method of claim 47, wherein the step of preparing the surface of the fiber web comprises applying a treatment selected from the group consisting of a plasma treatment, a heat treatment, and a flame treatment.

49. The method of claim 38, wherein the step of exposing the monomer coating to sufficient energy comprises applying an energy source selected from the group consisting of infrared, electron beam, thermionic, plasma, gamma, and ultraviolet radiation.

50. The method of claim 49, wherein the energy source has a wavelength of about 160 nm to 450 nm.

51. The method of claim 38, wherein a charge stabilizing additive is incorporated into the fiber web as a meltblown additive.

52. The method of claim 51, wherein the charge stabilizing additive is a fatty acid amide.

53. The method of claim 52, wherein the fatty acid amide is selected from the group consisting of stearamide, ethylene bis-stearamide, and ethylene bis-palmitamide.

54. The method of claim 53, wherein the charge stabilizing additive is present in the meltblown fiber web at a concentration in a range from about 0.01% to 20% by weight